REMARKS:

Applicant, his principal representatives in Germany, and the undersigned have carefully reviewed the first Office Action of August 14, 2009 in the subject U.S. patent application, together with the prior art cited and relied on by the Examiner in the rejections of the claims. In response, the Substitute Specification and the claims have been amended. It is believed that the claims which are now pending in the subject application are patentable over the prior art relied on, taken either singly or in combination. Reexamination and reconsideration of the application, and allowance of the claims is respectfully requested.

The subject application describes and claims a method and a device that are usable to control the temperature of a component of a printing press. As may be seen in Fig. 1 of the drawings, this component, generally at 01, is preferably a cylinder or a roller, and more specifically is an ink roller of a printing press. The ink that is applied to the surface of the ink roller 01 and which is transferred from that ink roller 01 to a subsequent roller, is a fluid whose viscosity and degree of tack or stickiness are both functions of its temperature. It is very important that the temperature of the surface of the ink roller 01 be carefully and accurately controlled.

In accordance with the present invention, a fluid is circulated through the roller 01 along a first circuit for the flow of fluid, generally at 03. Depending on the ambient temperature and the characteristics of the ink being used, the fluid flowing in the first circuit 03 may be used to either heat or to cool the ink roller 01. A second circuit of the fluid 04 is connected to a source of either heat or cooling, which source is not

specifically depicted. The fluid in the second circuit 04 is kept at a constant temperature Tv.

The first circuit for fluid flow 03 is connected to the second circuit for fluid flow at a first connection point 06 and at a second connection point 08. Fluid at the constant temperature Tv is added to the first circuit 03 at the first connection point 06. Fluid whose temperature has been elevated or decreased, due to passage through the ink roller 01 is returned from the first circuit for fluid flow 03 to the second circuit for fluid flow 04 at the second connection point 08. The first circuit for fluid flow 03 also has a partial path 14 that acts as a bypass between the connection points 06 and 08 between the first fluid flow circuit 01 and the second fluid flow circuit 04.

A valve 07 is positioned in an inflow path 12 of the first fluid flow circuit 03. The valve 07 is operable by a regulating device 21, which will be discussed in detail shortly, and is used to adjust or to regulate the amount of fluid at the constant temperature Tv which is allowed to enter the first fluid flow circuit 03 from the second fluid flow circuit 04. A swirl section 17 is located downstream, in the direction of fluid flow in the first circuit 03, the valve and also after the connection point of the partial path 14 into the inflow path 12 of the first circuit of fluid flow 12. A pump 11 is situated further downstream, all as seen in Fig. 1.

The first circuit for fluid flow 03 includes the inflow path 12 to the inking roller 01. The first fluid circuit includes a passage or passages through the ink roller 01. It also includes a return fluid path 13 at the exit from the ink roller and the partial path 14. By carefully controlling the operation of the valve 07, through the use of the regulating

device 21, the temperature of, for example, an outer surface of the inking roller 01 can be carefully controlled.

A plurality of temperature measuring points are located in the first circuit for fluid flow 03. A first one M1 is located intermediate the swirl section 17 and the pump 11 in the inflow path 12. A second one M2 is positioned near an inflow point to the inking roller 01. A third M3 can be situated so that it will determine the surface temperature of the ink roller 01. A fourth M4 can be positioned adjacent the outlet form the ink roller 01 and in the return fluid path 13. A fifth measuring point M5 can be placed just upstream of the entrance into the partial flow path 14 from the return fluid path 13 to the inflow path 12 of the first circuit for fluid flow.

These measuring points all determine a temperature of the temperature regulating fluid that flows through the first circuit for fluid flow 03. Depending on the temperature sensed by at least two of the temperature sensors located at these measuring points, the valve 07 is opened or closed to supply more or less fluid at the constant temperature Tv from the second circuit for fluid flow 04. The control of this valve 07 is the function of the regulating device or process depicted within the dashed lines at 21 in Fig. 1.

The temperature regulating fluid control device, generally at 21, is provided with at least two regulators. These regulators are arranged and connected in a cascade-like manner. As may be seen in Fig. 1, the output from the first regulator R1 is an actuating order Δ that is sent to the valve 07. This actuating order Δ is the result of the supply to the first regulator R1 of an input $\Delta\Theta_1$. That input $\Delta\Theta_1$ which is a deviation of a

temperature of the temperature regulating fluid at the first measuring point M1 from a corrected command value $\Theta_{1,soll,k}$, is supplied to the first regulator R1 from a second, cascaded regulator R2.

The output of the second regulator R2 $d\Theta_1$ is, in turn, a function of an actual value Θ_2 of the temperature regulating fluid at the second measuring point M2 and a corrected command value $\Theta_{2,soll,k}$ which was supplied to the second regulator. The combination of the corrected command value $\Theta_{2,soll,k}$ and the actual temperature Θ_2 at the inlet to the ink roller 01 is fed into the second regulator R2 as a deviation $\Delta\Theta_2$ of the actual value Θ_2 from the corrected command value $\Theta_{2,soll,k}$.

If there are only two cascaded regulators R1 and R2, the corrected command value $\Theta_{2,soll,k}$ would be supplied as the temperature that should exist at the inlet to the inking roller. If, as depicted in Fig. 1, there is a third regulator R3 that is cascaded with the first and second regulators R1 and R2, the $\Theta_{3,soll}$ that is fed into the third regulator R3 and that is compared with an actual temperature Θ_3, is the temperature that the surface of the inking roller 01 should be. In this situation, the deviation $\Delta\Theta_3$ of the actual ink roller surface temperature Θ_3 from the desired surface temperate $\Theta_{3,soll}$ is fed as an input into the third regulator R3. The output from the third regulator $d\Theta_2$ is then sent to the second regulator R2 as a deviation $\Delta\Theta_2$. This deviation $\Delta\Theta_2$ is the deviation of the corrected command value $\Theta_{2,soll,k}$, which results from the acting on of the output from the third regulation $d\Theta_2$ by a theoretical command value $\Theta'_{1,soll}$ at a point K2', The corrected command value $\Theta_{2,soll,k}$ is compared with the actual temperature value Θ_2 to result in the deviation of Θ_2 from the corrected command value $\Theta_{2,soll,k}$. That deviation

$\Delta\Theta_2$ is the input to the second regulating device R2.

In accordance with the present invention, the theoretical command values $\Theta'_{2,soll}$ and $\Theta'_{1,soll}$ are determined based, in part on a running time constant of the temperature regulating fluid in the first circuit for fluid flow 03. This circuit is a relatively long run of fluid conduit. The temperature of the fluid flowing in this conduit, as it flows along the conduit from the first measuring point to the second measuring point, and to subsequent measuring points, will change. The running time constant is provided to the regulators, in accordance with the present invention, to more accurately control the output of the first regulator R1 so that ultimately, the valve 07 will operate properly so that the temperature of the outer surface of the inking roller 01 will remain constant. Other functions or variables such as the running time of the fluid in the tube or conduit between the sensors, as depicted in Fig. 2; the existence of a time constant exchange, which essentially causes an excess of an amplitude of change and then returns to normal, as depicted in Fig. 3; the existence of frictional heat generated by the number or revolutions of the ink roller 01 and the like can also be provided to the regulators. The intent of all of this is to insure, to the extent that is reasonably possible, that the temperature of the surface of the ink roller 01, or the temperature of some point, such as the inlet to the ink roller, is maintained constant at a desired temperature. The method and the device to accomplish this, in accordance with the present invention, is a new, novel and patentable method and device to accomplish that result.

In the first Office Action of August 14, 2009 in the subject U.S. patent application, Examiner Rahim noted two minor informalities in claims 62 and 78. Claim

62 has been amended and claim 78 has been cancelled. It is believed that claim 62, as well as the rest of the claims which are currently pending in the subject application are free from similar informalities.

Claims 44-51, 53, 57-67, 71-78 and 80-83 were rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,931,376 to Meyer. Claim 53 was rejected under 35 U.S.C. 103(a) as being unpatentable over Meyer in view of U.S. Patent No. 3,415,720 Rijnsdorp. Claims 54 and 68 were rejected as being unpatentable over Meyer in view of U.S. Patent No. 5,025,381 to Goodzeit. Claims 55, 69 and 79 were rejected under 35 U.S.C. 103(a) as being unpatentable over Meyer. Claims 56 and 70 were rejected as being unpatentable over Meyer in view of U.S. Patent No. 4,582,008 to Sager. Claims 84 and 85 were rejected under 35 U.S.C. 103(a) as being unpatentable over Meyer in view of U.S. Patent No. 5,657,637 to Mertens.

Initially, during a review of the Substitute Specification of the subject application, in the course of the preparation of the subject Amendment, several minor typographical errors were noted. These have been corrected in a manner which does not add any new matter.

Currently, claims 44 and 64 are the only two independent claims now pending in the subject application. These two claims have been substantially amended to more closely conform their language to claims 1 and 18 in the corresponding European Patent No. EP 1,572,459 which issued from the European national phase application. Both of claims 44 and 64 were rejected under 35 U.S.C. 102(b) as being anticipated by the prior art Meyer patent, No. 5,931,376. The bulk of the following discussion will be

directed to the differences between currently amended claims 44 and 64 and the prior art Meyer device.

Claims 44 and 64 have both been amended to positively recite that the component is a roller or a cylinder of a printing press. In the Meyer patent the invention is directed to the conditioning of the ambient air in an air-conditioned room containing textile machines. An important difference is immediately discernable because the Meyer patent is described to the control of the air surrounding one or more sources of heat. In contrast, the subject invention is directed to a method and a device that is usable to control the temperature of the device itself. In other words, Meyer conditions the air in a room so that heat which is added to the room, by the machine which is located in the room, will be removed from the ambient air. In substantial contrast, in the subject invention, the temperature of a flow of a temperature regulating fluid that is flowing in closed fluid flow paths and through an object, is regulated to control the temperature of that object. The temperature of an object, through which the fluid is caused to flow, is controlled by regulating the amount of the temperature regulating fluid that flows through the object. In the Meyer device, the machines in the room give off heat. There is no attempt made to control the heat that those machines give off. Instead, the Meyer patent is concerned with removing heat from the air that surrounds the machines. It would be unexpected that one of skill in the art could or would attempt to utilize the disclosure of the Meyer patent to control the temperature of a component of a printing press using the method recited in currently amended claim44 or the device recited in currently amended claim 64. Meyer does not anticipate or render obvious the

method and the device set forth in currently amended independent claims 44 and 64 respectfully.

In the Meyer patent, as depicted in Fig. 1 thereof, a room 1 contains various pieces of textile equipment, specifically ring spinning machines 2 and spooling machines 3. Air conditioned air is supplied to the room from an air supply duct 5. Air is removed from the room through an air discharge duct 6. Air is also removed from the area adjacent the machine by a machine air discharge duct 7. The removed air is passed through a filter 8 by the operation of a blower 9 and is fed to a mixing unit 11. external air is fed into the mixing unit 11 through an external air duct 13. The air then is fed through a duct 14 into a cooling unit 17 which is operated by a process computer 26. The process computer 26 controls a valve 18 which, in turn, controls the refrigerant supplied to the cooling unit and hence the extent to which the air flowing into the cooling unit 17 from the duct 14 is cooled. Once the air has been cooled in the cooling unit 17, it is passed through an air scrubber 19, a heater 22 and is forced, by a blower 23 along the air supply duct 5 back into the room 1.

It is again to be noted at this point, that the Meyer system is used to control the temperature of the air in the room. In this way, it is essentially the inverse of the subject invention. In the Meyer device, the air in the room is heated by objects in the room. That heat has to be removed and the humidity has to be controlled. The flow of air into the room, through the room and out of the room back to the air conditioning system is all for the purpose of removing heat from the room. That heat being removed was generated by the equipment placed in the room.

In the subject invention, as recited in currently amended claims 44 and 64, the temperature of an inherently solid object, the ink roller, is being controlled. There is nothing in the interior of the ink roller that is generating heat which has to be removed. The ink roller may become heated from the exterior due to its rotational movement and due to its exterior contact with other rollers. However, it does not have something in it that is generating heat. The fluid that is being supplied to the ink roller; i.e. the temperature regulating fluid, is being supplied for the purpose of controlling the exterior temperature of the roller. In Meyer, the air conditioned air which is being supplied to the interior of the essentially hollow room, is being supplied for the purpose of removing heat that has been generated by the equipment which is located in that room. It thus is again questioned whether one of skill in the art would look to the teachings of the Meyer device to implement a solution to the problem to which the subject invention is directed.

It is admitted that Meyer discloses the use of cascaded control loops. The first control loop 31 is the room air controller. The second control loop 32 is the supply air controller. As seen in Fig. 2 of Meyer, the room air controller 31 receives an input R-Soll which is the desired value of the air in the room. It also receives an input R-1st which is a temperature and humidity measured value for the first controlled system 33; i.e. the room. An output from the first control loop is a value Z-Soll which is a set point for the temperature and humidity for the room. This is sent to the second control loop, which is the supply air controller. The second control loop sends an output to the second controlled system; i.e. the air conditioning system 16. The second controlled system 34 and specifically the adjustable valve 18 thereof controls the supply of refrigerant to the

cooling unit 17. The result is that the air is cooled to the appropriate level before it is sent back to the room 1.

In the present invention, as set forth in currently amended claims 44 and 64, there are provided at least two control loops. The outer control loop is provided with an input $\Theta_{2,soll}$, if there are only two control loops, or $\Theta_{3,soll}$, if there are three cascaded control loops, as depicted in Fig. 1. The value is the desired temperature which should be maintained at the outer surface of the inking roller. The outer control loop of the present invention is also provided with a running time constant, as recited in both of amended independent claims 44 and 64. The running time constant is an indication of the fact that the temperature decay of the temperature regulating fluid takes place as the fluid moves from the fluid feed-in point through the fluid inflow path to the roller. That feature of the present invention, as recited in currently amended independent claim 44 and 64 is not shown or suggested in the prior Meyer patent.

In the rejection of claims 53 and 67 of the subject application, the discussion of the Meyer reference is misinterpreted. It is stated in the Office Action that 41 of Meyer is a pre-regulating element that is usable to set a running time. In the subject application, the regulators R1, R2 and R3 can be embodied as PI regulators or as proportional-integral-regulators, as discussed at paragraph 044 of the Substitute Specification. This is not the same as the providing of a pre-regulation number which is usable to build a corrected set-point value for at least the outer control loop. In the subject invention, the pre-regulation member in Fig. 2 is $V_{LZ,2}$, when using regulators R1 and R2 as the inner and outer loops regulators, respectively. It allows the entry of a

running time constant into the calculation of the corrected outer control loop corrected command value.

In the Meyer patent, the element 41, which is depicted in Fig. 3 is an integral element, not a time integral element as asserted in the Office Action, at the discussion at the bottom of page 4 of the Detailed Action. The purpose of the device 41 in the Meyer reference is to receive a signal from a second difference element 39, after that signal has passed through an amplifier 40. The signal that is put out by the second difference element 39 is the set point Z-Soll for the supply air temperature. It is directed to the second controlled system 34 for the air conditioning system 16. The signal generated by the second difference element 39 is formed as the difference between the set point signal Z-Soll for the supply air temperature and the added value Z-1st of the supply air temperature. There is no discussion or suggestion in the Meyer reference of a consideration of a running time constant in the determination of an outer control loop corrected command value that is to be sent from the outer control loop as an input value for the inner control loop. It is thus again asserted that currently amended method claim 44 and device claim 64 are patentable over the Meyer reference.

All of the rest of the claims now pending in the subject application depend from either believed allowable, currently amended claim 44 or claim 64. The secondary references cited by the Examiner to modify the disclosure of the Meyer reference do not provide the teachings of the subject application, as recited in claims 44 and 64, which are missing from the Meyer reference. It is thus believed that all of these dependent claims are also allowable.

SUMMARY:

Several paragraphs of the Substitute Specification have been amended to correct minor typographical errors, without the addition of any new matter. Independent claims 44 and 64, as well as various ones of the dependent claims, have been amended. It is believed that the claims which are now pending in the subject application are patentable over the prior art cited and relied on, taken either singly or in combination. Allowance of the claims, and passage of the application to issue is respectfully requested.

Respectfully Submitted,

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